CORRESPONDENCE/MEMORANDUM

DATE: January 4, 2019

TO: Grand Rapids Flowage

FROM: Michael Donofrio

SUBJECT: 2018 Grand Rapids Flowage Electroshocking Surveys

Grand Rapids is an impoundment created by the Grand Rapids hydroelectric dam on the Menominee River (boundary water with Michigan). The dam is owned and operated by the Wisconsin Public Service and licensed through the Federal Energy Regulatory Commission. White Rapids dam is located over 20 miles upstream and Upper Scott flowage, created by the Park Mill dam, is 20+ miles downstream. Grand Rapids is located about 14 miles east of the Wausaukee in eastern Marinette County (Appendix). Grand Rapids dam is operated as a run of river impoundment. In 2001, the Federal Energy Regulatory Commission re-licensed the Grand Rapids Hydroelectric Project operated by Wisconsin Public Service. The project operated at run-of-river mode with outflow equalizing inflow and pool elevation is maintained between 1033.4 feet and 1034.9 feet above sea level.

A comprehensive fisheries survey (electrofishing and fyke netting) was completed in 2003-04 (Donofrio 2006). The conclusions from the 2003-04 survey were: 1) good northern pike and smallmouth bass populations, and 2) very good potential as a walleye fishery. Fishing pressure was previously characterized as light to moderate (Thuemler and Schnicke, 1993). This report will include comparisons to the 2003-04 surveys. The only species stocked were walleye on even years in 2014, 2016, 2018 as fall fingerlings. No stocking for any other species occurred prior to 2014.

The lake has a surface area of approximately 259 acres. The maximum depth is 21 feet and has 4 shoreline miles. Aquatic vegetation exists in all shallow bays and a large area upstream from the Wisconsin side of the dam has several flooded stumps. Eurasian watermilfoil is present. The shoreline is undeveloped and entirely owned by Wisconsin Public Service. WPS maintains two public boat access sites off Michigan State Road 577 in Michigan and Grand Rapids Road in Wisconsin. There are also good shore fishing opportunities in both states.

METHODS

Data collection

A WDNR standard direct current electrofishing boat was used to sample 90-100% of the shoreline on three dates (May 10, 21 and September 26, 2018) (Appendix). The electrofishing settings were 240-310 volts, 6-13 amps, a pulse rate of 60 and duty cycle from 25%. This flowage was fyke netted in 2004 but applicable comparisons are only performed for electrofishing surveys completed in 2003-04. Total length of gamefish and a sub-sample of panfish were measured to the nearest 0.1 inch. In 2018, scales or dorsal spines were collected from a sub-sample of fish stratified within 0.5 inch bins. Ages were assigned to fish after scales and spines were aged using standard WDNR procedures by WDNR and UW Stevens Point staff.

Data analysis

Total catch and catch per gear type was calculated for all species. Catch summary reflects combined spring and fall surveys in both years because of changes to sampling protocol between

sampling years. Length frequency distributions were performed for walleye and smallmouth bass. Smallmouth bass were collected in the spring and fall surveys of 2003-04 but only during the May surveys in 2018. We combined the spring and fall 2003-04 data to conduct length frequency analysis for those surveys years to achieve better sample sizes. A subsample of walleye, smallmouth bass and yellow perch were aged for comparisons, but data presented in this report only reflects fish aged from the May 2018 surveys.

RESULTS AND DISCUSSION

The electrofishing surveys occurred along 3.9 miles of shoreline in 2003-4 and 3-4 miles in 2018. The effort for each survey was approximately 1.7 to 2 hours for every survey. In 2018, we captured 238 individual fish representing 7 species during the 3 shocking surveys (Table 1). The species diversity was similar for both 2003-04 and 2018 but species abundance (CPE or fish per mile) was higher in 2003-04. 29 fish per mile compared to 21.9 in 2018. Slightly more fish were caught in 2018 (N= 238) compared to 2003-04 (N= 232). In 2018, water temperatures at the time of the evening surveys was 56 F on May 10th, 63 F on May 21st and 60 F on September 26th.

In 2018, the most abundant species in our catch were walleye, smallmouth bass, and rock bass. Yellow perch and northern pike were present but more abundant in 2003-04. Largemouth bass were captured in 2003-04 but not in 2018. Lake sturgeon and burbot were captured in lower numbers. Other fish observed during both survey years were redhorse spp., common carp, and white sucker.

Gamefish

In 2018, 75 walleye that were collected during the 3 surveys ranged in size from 4.0 inches (in) to 15.7 inches with an average length of 7.2 in (Table 2). The size distribution was similar in 2003-04 when the mean length was 9.2 inches and the size range was 4.2 to 26.2 inches but 10% of the walleye were greater than 15 inches. Analysis of aging structures taken from a subsample of 24 walleye indicated that ages 1 through 4 were present in our samples (Table 3). Ages 1 and 2 walleye were the most common ages in our sample. Length at age comparison between walleye in Grand Rapids to northern Wisconsin data was determined with the aging data (Table 4). Survey data indicated that walleye in Grand Rapids Flowage appear to be growing faster than other northern Wisconsin lake average rates. Based on the age and length distribution, recruitment was evident in 2003-04 and 2018 and further supported by the 18 young of year (YOY) per mile caught in the fall of 2018. Walleye were stocked in 2014 and 2016 but not before the September 2018 survey. The length frequency of walleye for both years indicated recruitment was evident. This data also demonstrated that fish were under 15 inches were dominant in the surveys.

In 2018, 124 smallmouth bass that were collected during the surveys ranged in size from 8.8 to 20.5 inches and had an average length of 15.4 inches. The size range was similar for 2003-04 (7.20 to 18.6 inches) but the average size was smaller in 2003-04 at 12.9 inches. For 2018, 81 of the smallmouth bass (65%) were longer than the 14 inch minimum size limit (Table 5). The size distribution of smallmouth bass was similar for 2003-04 and 2018 survey years but only 29% were greater than 14 inches in length in 2003-04 (Figure 1).

Analysis of aging structures taken from a subsample of 95 smallmouth bass indicated that ages 1 through 12 were present in these surveys (Table 5). Ages 4-8 represented 74% of the Smallmouth Bass aged with no fish aged as 1 or 2 years old. Length at age comparison between smallmouth Bass in Grand Rapids Flowage to northern Wisconsin averages can be made with the aging data that we collected to determine how bass are growing in the impoundment (Table 6). On average, smallmouth bass were 5 years old before reaching the minimum size limit. Survey data indicates that smallmouth bass in Grand Rapids Flowage appear to be growing at a faster rate for ages 3-7 compared to other northern Wisconsin average rates but slower for ages 8-12. Based on the age and length distribution, smallmouth bass recruitment was evident in both 2003-04 and 2018 surveys.

Other gamefish in 2018 included 8 northern pike but no largemouth bass. In 2018, pike were caught in fewer numbers compared to 2003-04 (N= 47). For 2018, pike ranged in size from 15.4 to 27.8 inches and the average length was 20.3 inches. The pike were aged from 2-8 years with 50% of those fish aged at 3 years old.

Panfish

Rock bass were the most abundant panfish captured during the both surveys. The 2018 sample of 14 rock bass ranged in length from 3.2 to 9.6 inches and had an average length of 5.5 inches. In 2018, six of the 14 (43%) rock bass had a length greater than 6 inches. In 2003-04, the length range was 4.0 to 7.4 inches with an average length of 3.8 inches. Rock bass were not aged.

The 9 yellow perch that were collected during the 2018 surveys ranged in size from 5.6 in to 12.6 inches. Those fish had an average length of 7.9 inches (Table 2). Four of the nine perch (44%) were longer than the 8 inch (quality size). Yellow perch were more common (28) in 2003-04 but smaller with an average length of 6.4 inches. 2018 age analysis from those 9 perch indicated that ages 2 and 7 were present and 44% were aged at 2 years. The average length of a 2 year perch was 5.9 inches while the age 4 perch (N=3) had an average length of 9.6 inches. Both values indicate these perch had better growth rates compared to other northern Wisconsin perch populations.

Five lake sturgeon were captured, PIT tagged and released. Lake sturgeon are common in this section of the Menominee River. One of the lake sturgeon was a recapture that was stocked as a yearling in 1999 and grew 40 inches in 20 years. Tissue samples were taken from the 3 burbot and shipped to Dr. Kim Scribner at Michigan State University for a Great Lakes basin genetic research project.

CONCLUSIONS

The upstream boundary of this flowage is approximately 3 miles upstream of the dam as defined by shallower river depths. Some rapids and likely good spawning habitat exist for a variety of species in the 20+ miles upstream before White Rapids Dam (next upstream dam). Therefore, fish not only have access to the flowage but several riverine miles.

Overall, the fishery of Grand Rapids Flowage appears to be in good condition. The Fall of 2018, electrofishing event on this flowage yielded a walleye fishery with very good evidence of

survival of juvenile walleye (18 YOY/ mile). Several walleye (98%) were under the stocked size range of 7-8 inches indicating natural recruitment. The smallmouth bass population is very strong as indicated from the abundance of bass observed during the surveys and an average size of 15.4 inches from 124 bass. The panfish community is supported by good numbers of rock bass with yellow perch observed in lower numbers. Bluegill, pumpkinseed and black crappie were present during the 2003-04 fish surveys but absent in 2018. The 2003-04 surveys also documented low numbers of muskellunge.

Results of these recent surveys corroborate observations from 2003-04 that the regulation of the hydro-electric facilities and the subsequent stabilization of the water level appear to have had a positive effect on improving the fishery since the new FERC license was issued in 2001. Natural coarse, woody structures and gravel bars in the impoundment are present so no additional habitat work is needed. Since the shoreline is entirely owned by Wisconsin Public Service, there would appear to be not threat from development.

This flowage offers anglers a diverse fishery with evidence of good recruitment for several species. The current regulations appear appropriate for this impoundment especially with apparent light fishing pressure. I recommend additional electrofishing surveys of Grand Rapids in 8-10 years. Public access to Grand Rapids is adequate. I would recommend no improvements to the current boat landing facilities. There are also good public shore fishing opportunities. This impoundment is located in an undeveloped setting several miles east of Wausaukee, WI.

ACKNOWLEDGMENTS

Ben Ewoldt, Kevin Pankow, Scott Poquette, Chip Long and Cory Wienandt assisted with data collection, aged of fish structures and entered the data into the state database. Jennifer Johnson of Michigan DNR assisted in the field. Connie Isermann from UWSP aged the smallmouth bass.

REFERENCE

Donofrio, M.C. 2006. Comprehensive Fisheries Survey of Grand Rapids Flowage, Marinette County Wisconsin during 2003-04. Wisconsin Department of Natural Resources, Peshtigo, WI 11 pp.

Thuemler, T.F. and G. Schnicke. 1993. Menominee River Fisheries Management Plan, File Report. Wisconsin Department of Natural Resources, Marinette, WI 51 pp.

Table 1. Electrofishing Survey Statistics in 2003-04 and 2018 for Grand Rapids Flowage, Wisconsin- Michigan.

Description	May 10 2018	May 21 2018	June 10 2004	September 26 2018	October 1 2003
Effort (miles)	3.6	3.9	4.0	3.0	4.0
Effort (hours)	1.76	1.75	2.0	1.75	2.0
No of Fish	43	128	40	59	192
Water Temperature (F)	56	63	66	60	49

Table 2. Catch summary from 2018 and 2003-04 electrofishing surveys of Grand Rapids Flowage, Wisconsin- Michigan. CPE is fish per mile. Total effort 8 miles in 2003-04 and 10.5 in 2018.

		2018				2003-04		
Species	Number Caught	CPE	Mean Length	Size Range	Number Caught	CPE	Mean Length	Size Range
Yellow Perch	9	0.9	7.9	5.6-12.6 in	28	3.5	6.4	3.5-9.5
Rock Bass	14	1.3	5.5	3.2-9.6 in	30	3.8	5.9	4.0-7.4
Smallmouth Bass	124	11.8	15.4	8.8-20.5 in	55	6.9	12.9	7.2-18.6
Walleye	75	7.1	7.2	4.0-15.7 in	63	7.9	9.2	4.2-26.2
Northern Pike	8	0.8	20.3	15.4-27.8 in	47	5.9	16.1	6.9-22.1
Largemouth Bass	0	0.0	---	---	9	1.1	5.1	3.3-16.5
Total	230	21.9			232	29.0		

Table 3. The size and age distribution of walleye captured during the May 2018 electrofishing surveys of Grand Rapids Flowage, Wisconsin- Michigan. Standard Deviation is S.D.

Length (in)	Number	Age 1	Age 2	Age 3	Age 4
4	0				
5	1	1			
6	0	0			
7	0	0			
8	1	0	1		
9	2	1	1		
10	6	3	1	2	
11	1	0	1	0	
12	2	1	0	1	
13	0		0		
14	0			0	
15	1				1
Total	14	6	4	3	1
Average Lt	10.5	9.7	10.2	11.1	15.5
S.D.	2.2	2.2	1.2	0.9	0

Table 4. Average length at age for walleye captured during May electrofishing surveys in 2018 on Grand Rapids Flowage. Average length at age information from WDNR northern region database 2014 and lengths are inches.

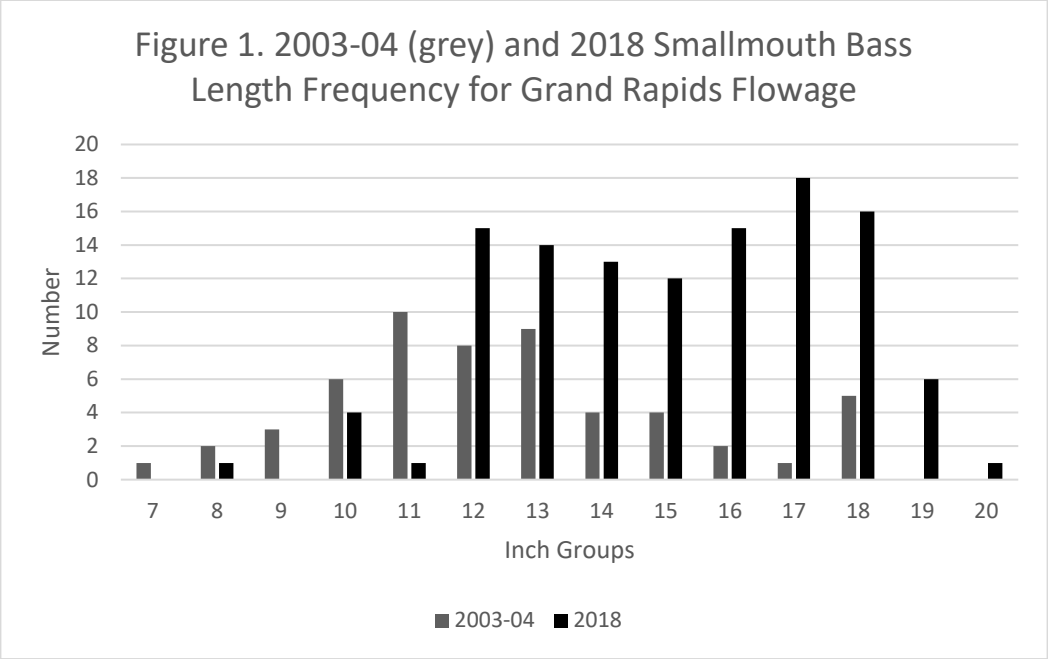
Species	AGE 1	AGE 2	AGE 3	AGE 4
Walleye 2018	9.7	10.2	11.1	15.5
Northern Average 2014	6.7	9.6	11.5	13.5

Table 5. The size and age distribution of smallmouth bass captured during the May of 2018 electrofishing surveys of Grand Rapids Flowage, Wisconsin- Michigan.

Length (in)	Number Aged	Age 1	Age 2	Age 3	Age 4	Age 5	Age 6	Age 7	Age 8	Age 9	Age 10	Age 11	Age 12
11	1	0	0		1								
12	11			3	6	2							
13	14			2	7	2	3						
14	11				2	4	3	2					
15	11					4	2	4	1				
16	12					0	3	5	4	1			
17	16					1	2	2	3	4	3		1
18	12							3	4	2	1	2	0
19	5									1	3	1	
20	1											1	
Total	95	0	0	5	16	13	13	16	12	9	7	4	1
Average Length	15.8	-	-	12.8	13.1	14.5	15.3	16.6	17.3	17.7	18.4	19.3	17.4
S.D.	2.2	-	0.8	0.6	0.7	1.2	1.3	1.2	1.0	1.0	0.9	1.1	-

Table 6. The size and age distribution of smallmouth bass captured during the May 2018 electrofishing surveys of Grand Rapids Flowage, Wisconsin- Michigan. Average length at age information from WDNR northern region database (2014) and lengths are inches.

Species	AGE 1	AGE 2	AGE 3	AGE 4	AGE 5	AGE 6	AGE 7	AGE 8	AGE 9	AGE 10	AGE 11	AGE 12
Smallmouth Bass 2018	-	-	12.8	13.1	14.5	15.3	16.6	17.3	17.7	18.4	19.3	17.4
(Northern Average)	(4.4)	(7.1)	(9.2)	(11.1)	(13.3)	(15.0)	(15.9)	(18.0)	(18.9)	(19.9)	(--)	(18.9)



APPENDIX

Map indicating Wausaukee, WI as well as Menominee River and Grand Rapids (denoted by white circles) impoundment.

Grand Rapids Flowage electrofishing route during 3 nights of effort in 2018 (denoted by white line).